REMARKS

The present invention relates to a method and a device for controlling a crane drive unit so as to suppress the sway of a load carried by the crane so that it is at a minimum during and after the transportation of the load.

To accomplish this purpose, the method and device for controlling a crane uses a feedforward control program. It includes a filter unit that can remove a component near a resonance frequency from a transportation command for the load. This is achieved by the following technical feature that has been added by amendment to independent claims 1-4 and 7:

"wherein based on expression (1) or (2), the component near the resonance frequency is removed by using parameters a_i (f) and b_j (f), which are determined by computing them in a simulation in which a model expressing the characteristics of the crane is used, while changing their values little by little, and which values are stored,

Expression (1)

$$y(t) = b_0(f)x(t) + b_1(f)x(t-1) + b_2(f)x(t-2) + \cdots - a_1(f)y(t-1) - a_2(f)y(t-2) - \cdots$$

$$y(t) = \sum_{j=0}^{m} b_j(f)x(t-j) - \sum_{i=1}^{n} a_i(f)y(t-i)$$

where a_i (f) and b_j (f) are parameters mediated by the resonance frequency f sequentially computed for the varying length of the rope, and

Expression (2)

$$F(S) = \frac{Y(S)}{X(S)} = \frac{b_0(f)S^0 + b_1(f)S^1 + b_2(f)S^2 + \cdots}{a_0(f)S^0 + a_1(f)S^1 + a_2(f)S^2 + \cdots} = \frac{\sum_{j=0}^{m} b_j(f)S^j}{\sum_{i=0}^{n} a_i(f)S^i}$$

where expression (1) is obtained by carrying out a Z-transformation to the transfer function of the filter shown in expression (2), and S is a Laplacian operator.

Support for the amendment can be found on page 8, lines 11-15.

Namely, the method and device of the present invention can control a crane by removing a component near a resonance frequency from a transportation command, based on the resonance frequency that momentarily changes (namely, the length of the rope that momentarily changes). Thus, even if the length of the rope momentarily changes, the crane can be controlled so as to suppress the sway of the load suspended by the rope of the crane. Because of this the higher-mode vibration of the crane can be controlled.

In the office Action, the Examiner rejected claims 1-3 under 35 U.S.C. §102(b) for being anticipated by U.S. patent No. 6,102,221 to Habisohn. In addition, claims 4-7 were rejected under 35 U.S.C. §102(e) for being anticipated by U.S. Patent No. 6,442,439 to Robinett et al.

However, neither Habisohn nor Robinett et al. teach the above described technical feature which is now a part of each of independent claims 1-4 and 7.

Accordingly, it is not believed that any of claims 1-4 and 7 or claims 5 and 6 dependent from claim 4 are anticipated by either reference. Their withdrawal as a ground of rejection of the claims under §102 is therefore requested.

It is believed claims 1-7 are in condition for allowance.

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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